Row Operations

Types of systems:

2D \mathbb{R}^2 ::

- Non-parallel lines
- Identical lines
- Parallel lines

3D \mathbb{R}^3 :

- Unique solution
- Infinite number of solutions
- No solutions

Row operations:

- (Replacement/ Addition) Add a multiple of one row to another.
- (Interchange) Interchange two rows.
- (Scaling) Multiply a row by a non-zero scalar.

$$\left\{egin{array}{l} x_1-2x_2+x_3=0\ 2x_2-8x_3=8\ 5x_1-5x_3=10 \end{array}
ight.$$

Row₁ +Row₂

$$\begin{cases} x_1 - 7x_3 = 8 \\ 2x_2 - 8x_3 = 8 \\ 5x_1 - 5x_3 = 10 \end{cases}$$

$$Row_2/2$$

 $\$ \begin{equation} \begin{cases} x_1-7x_3=8\\ x_2-4x_3=4\\ 5x_1-5x_3=10 \end{equation} \$\$ \end{equation} \$\$

 $\$ \begin{equation} \begin{cases} x_1-7x_3=8\\ x_2-4x_3=4\\ 10x_2-10x_3=10 \end{cases} \end{equation} \$\$ **Note: \$\text{Row}_1\$ represents the original \$\text{Row}_1\$ not the modified \$\text{Row}_ 1\$

Row_3 - 10 Row_2

 $\$ \begin{equation} \begin{cases} x_1-7x_3=8\\ x_2-4x_3=4\\ 30x_3=-30 \end{cases} \end{equation} \$\$ \$\$x_3=-1\$\$

Substiution